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THE RESULTS OF A TEN YEAR VOLUNTARY MUSKELLUNGE CREEL CENSUS  
AT LITTLE GREEN LAKE, GREEN LAKE COUNTY, WISCONSIN, 1963-1972

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ABSTRACT

Following treatment of 467-acre Little Green Lake, Green Lake County, Wisconsin in 1956, muskellunge were introduced. All fish of this species stocked since 1960 were marked distinctly, with first identified fish entering the fishery in 1963, the year a voluntary creel census was originated. During the 10 years of the study from 1963 to 1972, 1,348 muskellunge were reported caught by fishermen. The fish registered weighed 11,923 pounds, averaged 32.9 inches in length and 8.9 pounds, while an average of 2.6 pounds per acre, per year was harvested. Known-age muskellunge from the September, 1960 plant were followed from the time they first entered the fishery to virtual extinction with 407 fish being caught of a plant of 1,500 during the survey. Hybrid muskellunge stocked as 2-5 month old fish in 1970, entered the fishery in 1972, comprising 147 of the 369 muskellunge caught during the 1972 season.

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INTRODUCTION

On July 23, 1956, Little Green Lake, a 467 acre, eutrophic body of water in Green Lake County was chemically treated to eradicate a carp and bullhead population that had survived a summerkill in 1955 and a winterkill in 1956. Following treatment, the lake was stocked with walleye, (Stizostedion vitreum), largemouth bass, (Micropterus salmoides), smallmouth bass, (Micropterus dolomieu), muskellunge, (Esox masquinongy), bluegill, (Lepomis macrochirus), pumpkinseed, (Lepomis gibbosus), yellow perch, (Perca flavescens), and white sucker, (Catostomus commersoni). Several other species of fish introduced by the public included green sunfish, (Lepomis cyanellus), black bullhead, (Ictalurus melas) and brown bullhead, (Ictalurus nebulosus).

Because Little Green Lake, in this manner, became the lake farthest south in Wisconsin to be stocked with muskellunge, a great deal of attention was focused on it by fishermen and fish management personnel of the Department of Natural Resources. The fertile, alkaline waters of the lake soon showed an excellent carryover of the muskellunge stocked, as well as rapid growth, with the first legal, 30-inch plus fish of this species being taken by fishermen in the summer of 1960, shortly after they became 3 years of age. (Hacker, 1966).

In order to document the growth of muskellunge in Little Green Lake, all fish of this species stocked since 1960 have been marked by removal of distinctive bones or fins. During 1963, boat livery operators on the lake agreed

to record requested information on all legal muskellunge brought in by fishermen and during that year, the first legal marked muskellunge were captured.

Boat livery operators were requested to record the following information from successful fishermen: (1) The month and date the fish was captured, (2) the name and address of the fisherman, (3) the length and weight of the fish (4) the location of the removed fin or bone, (5) the type of bait used, (6) the location on the lake where the fish was caught, (7) the hour of the day the fish was caught and (8) any comments regarding the fish, or fishing conditions.

To acquaint fishermen with muskellunge and the creel census program, signs were erected at the two public boat landings. The signs were designed to inform fishermen that the lake contained muskellunge, a species many local fishermen had never seen. The sign also reported that the lake did not contain northern pike, the species most likely to be confused with muskellunge. The legal size of muskellunge was noted to be 30 inches and fishermen were requested to register their fish at the nearest boat livery.

The response by fishermen to the request to register muskellunge was extraordinary, as was the cooperation of boat fleet operators, who kept excellent records of the fish brought into their liveries. Operators estimate that in excess of 90 per cent of all muskellunge caught by fishermen were registered. All of the information that follows was therefore obtained because fishermen and boat livery operators went out of their way to be of assistance to the Department of Natural Resources.

#### Muskellunge Stocked

Muskellunge recorded during the 10 year creel census originated from plants shown in Table 1:

Table 1: Muskellunge stocked in Little Green Lake, Green Lake County, 1957 - 1972

| Year                | Clip                                | Number Stocked | Average or Range in Length | Total Weight in Pounds | Average Weight in Pounds |
|---------------------|-------------------------------------|----------------|----------------------------|------------------------|--------------------------|
| 1957                | None                                | 300            | 8.7"                       | 30.0                   | 0.10                     |
| 1958                | None                                | 1,100          | 6.0-7.0"                   | 37.5                   | 0.034                    |
| 1959                | None                                | 600            | 6.0-6.3"                   | 15.9                   | 0.027                    |
| 1959                | None                                | 400            | 4.0-5.0"                   | 10.0                   | 0.025                    |
| 1960                | Right ventral fin                   | 1,500          | 8.4-13.3"                  | 266.5                  | 0.18                     |
| 1961                | Right pectoral or left ventral fin  | 107            | 4.8-11.9"                  | 15.5                   | 0.15                     |
| 1961                | Right pectoral or Left ventral fins | 277            | 6.1-12.5"                  | 43.5                   | 0.16                     |
| 1964                | Left maxillary bone                 | 2,000          | 9.0-13.0"                  | 588.2                  | 0.29                     |
| 1966                | Right maxillary bone                | 3,250          | 7.0-9.0"                   | 630.0                  | 0.19                     |
| 1967                | Right ventral fin                   | 1,040          | 9.0-11.0"                  | 340.0                  | 0.33                     |
| 1968                | Left ventral fin                    | 1,200          | 9.0"                       | 240.0                  | 0.20                     |
| 1969                | Left maxillary bone                 | 1,200          | 13.0-15.0"                 | 480.0                  | 0.40                     |
| 1970                | Left pectoral fin                   | 1,200          | 11.0"                      | 267.0                  | 0.22                     |
| 1970                | None*                               | 2,604          | 13.0-15.0"                 | 1,031.0                | 0.40                     |
| Totals and Averages |                                     | 16,778         |                            | 3,995.1                | 0.24                     |

\* Hybrid muskellunge. All others stocked are true muskellunge.

Table 1 shows that early stockings of muskies in Little Green Lake were unmarked and that the fish were of relatively small size. Studies soon showed the advantage of stocking larger sized fish, and plants from 1960 to the present have been placed in the lake during September or October when many individuals were in excess of 12 inches in length.

One plant not shown in Table 1 was made on June 30, 1960, consisting of 11,600 muskellunge which ranged in length from 1.5-2.0 inches. The entire group of fish weighed 14.5 pounds for an average of 800 fish to the pound. Despite intensive efforts by netting and electro-fishing to follow this group of fish, and by a comparison of the clips of all fish registered, not one fish of this plant was documented as being captured after the initial stocking.

After the 1961 plants, none were again made until 1964, specifically to determine whether or not the planting of muskellunge fingerlings lessened the possibility of natural reproduction. All muskellunge stocked from 1957 until 1970 have been true muskellunge capable of natural reproduction. During 1970, 2,604 hybrid muskies (a cross between northern pike males and muskellunge females) and incapable of natural reproduction, were stocked. Only a few native naturally reproduced muskellunge were found in the lake during the 3 year moratorium, and each year unmarked muskellunge are either registered or documented in department nets. It is estimated that no more than 1-2 per cent of the muskellunge in the lake are naturally reproduced.

Following resumption of planting in 1964, larger quotas were established on a biennial basis, but returns indicated best results would be obtained by annual stocking. This has continued from 1966 to 1972 and is recommended for future management.

During 1970, both true and hybrid muskellunge of the same age were stocked. Table 1 shows that the hybrid fish were almost twice as heavy as the true muskies although they were stocked in the lake within 10 days of each other. During 1972, 147 of the 369 or 39.8 per cent of the legal muskellunge registered were hybrid fish originating from the October, 1970 plant. Not one true muskie of the same stocking year reached legal size. In contrast, some of the hybrids were captured as large as 33.0 inches in length that were no more than 2 years and 6 months of age, phenomenal growth in any lake.

While hybrids supply a rapid return to the fishery, there are several disadvantages that must be considered. Hybrid muskies often bite voraciously during the winter months while true muskies rarely do. Hooked fish are invariable killed. Other fishermen catching hybrids during the winter take home "northern pike" and ignore the signs at the two public access sites which state: "Notice to fishermen. This lake does not contain northern pike. It does have hybrid and true muskies. They must be 30 inches to be legally taken. Register all legal muskies at any boat livery on the lake." Hybrid muskellunge also bite well during the summer and <sup>are</sup> particularly vulnerable under legal size. Legal hybrids apparently are harvested so heavily that at present it is doubtful that many will survive to reach large size, particularly in the view of the extremely heavy fishing pressure that appears to be increasing each year. For this reason, quotas proposed for the lake in the future will include 800 hybrids and 400 true muskies annually to allow some muskellunge to reach large size.

#### Total Registered Catch of Muskellunge, 1963-1972

Table 2 shows the muskellunge catch for each year of the 10 year creel census. It indicates that at least 1,348 muskellunge were taken that weighed a total of 11,923 pounds or 5.96 tons. Comparisons of Table 1 and 2 show that 8.0 per cent of the muskellunge stocked between 1957 and 1970 have been registered while weights have multiplied 3 times. However, many fish of the 1964 to 1970 plants still survive in the lake.

#### Annual Numbers

Analysis of the table shows that the lowest number of registered fish were recorded in 1970 (63), while the highest number was taken 2 years later in 1972 (369). The average number taken per year was 135, or 1 fish for every 3.5 acres of water. This compares to an estimated Wisconsin state-wide harvest of one fish for every 5.6 acres of muskie waters. (Oehmcke, Johnson, Klingbiel and Wistrom, 1958)

### Lengths

The average length of all muskellunge registered was 32.9 inches, but the range in average length per year was from 31.3 inches in 1963 to 35.8 inches in 1967. During the 5 years of the creel census when the numbers caught were below average (135), the average annual lengths were consistently above average. In contrast, when annual catches were above average, annual lengths were below average in 3 of 5 years.

The largest muskellunge registered during the 10 year period were 46.3 inches in length (in 1967 and 1971). One fish in excess of 49.0 inches was taken in department nets as late as March, 1973. In each year of the study the maximum size of registered fish always exceeded 41.0 inches. The smallest muskie registered was an illegal 29.5 inch fish by a person not named.

### Weights

The average muskellunge registered during the 10 year study weighed 8.9 pounds, with average annual weights ranging from 7.6 pounds in 1972 to 11.9 pounds in 1967. During the 5 years of below average catches in numbers, annual average weights were above the mean, while the 5 years of above average catches showed annual weights below or equal to the 10 year average.

The range in weight of all muskies registered was from 4.0 pounds in 1965 to 27.5 pounds in 1971, the latter being the heaviest fish registered to date. During 5 of 10 years of the survey, maximum weights exceeded 25.0 pounds and in 9 of 10 years were greater than 20.0 pounds.

Total annual weights ranged from a low of 547 pounds in 1970 to a high of 2,792 pounds in 1972. The 10 year annual average was 1,192 pounds.

Little Green Lake produced an average of 2.6 pounds of muskellunge per acre per year for the 10 year study with the lowest production of 1.2 pounds in 1970 and the highest, 6.0 pounds in 1972.



Table 2. Muskellunge Catch at Little Green Lake, Voluntary Creel Census, 1963-1972

| <u>Year</u>                    | <u>Number<br/>Caught</u> | <u>Average<br/>Length</u> | <u>Weight<br/>in Length</u> | <u>Average<br/>Weight</u> | <u>Range<br/>in Weight</u> | <u>Total<br/>Weight</u> | <u>Pounds<br/>Per Acre</u> |
|--------------------------------|--------------------------|---------------------------|-----------------------------|---------------------------|----------------------------|-------------------------|----------------------------|
| 1963                           | 136                      | 31.3                      | 30.0-41.0                   | 8.7                       | 6.0-16.5                   | 1,186.3                 | 2.54                       |
| 1964                           | 179                      | 32.9                      | 30.0-42.5                   | 8.9                       | 6.0-20.5                   | 1,583.8                 | 3.39                       |
| 1965                           | 156                      | 33.5                      | 30.0-45.4                   | 9.3                       | 4.9-27.4                   | 1,445.7                 | 3.10                       |
| 1966                           | 73                       | 35.1                      | 30.0-44.5                   | 11.2                      | 6.5-27.0                   | 816.9                   | 1.75                       |
| 1967                           | 70                       | 35.8                      | 30.5-46.3                   | 11.9                      | 7.0-26.2                   | 829.4                   | 1.78                       |
| 1968                           | 80                       | 33.7                      | 29.5-44.0                   | 9.7                       | 5.0-21.4                   | 774.9                   | 1.66                       |
| 1969                           | 73                       | 33.5                      | 30.0-45.0                   | 9.2                       | 5.5-22.3                   | 651.8                   | 1.40                       |
| 1970                           | 63                       | 33.1                      | 30.0-45.3                   | 8.7                       | 5.3-24.0                   | 546.8                   | 1.17                       |
| 1971                           | 149                      | 32.6                      | 30.0-46.3                   | 8.7                       | 6.0-27.5                   | 1,295.0                 | 2.77                       |
| 1972                           | 369                      | 31.9                      | 30.0-45.8                   | 7.6                       | 5.0-25.8                   | 2,792.3                 | 5.98                       |
| <u>Totals and<br/>Averages</u> | <u>1,348</u>             | <u>32.9</u>               | <u>29.5-46.3</u>            | <u>8.9</u>                | <u>4.9-27.5</u>            | <u>11,922.9</u>         | <u>2.55</u>                |

Little comparative information is available in the literature regarding the annual harvest of muskellunge. Chautauqua Lake in New York state, a 13,000 acre body of water, with a required reporting system produced an average of 4.6 pounds per acre, with a range of 3.1 to 6.5 pounds per acre between 1961 and 1971. (Mooradian and Shepherd, 1972) In contrast, Snow (1973) records a 0.2 pound per acre per year average for a 2 year period on 180 acre Murphy Flowage in northwest Wisconsin, an experimental water with no bag limit, size limit or closed season. Kempinger (1972) reports that during a 26 year period from 1946 through 1971, another experimental water, 293 acre Escanaba Lake in north central Wisconsin produced an average of 0.4 pounds per acre per year.

#### September, 1960 Plant

The first marked plant of muskellunge was introduced into Little Green Lake on September 22, 1960. A total of 1,500 4-month old fish was stocked that ranged in length from 8.4 to 13.3 inches and weighed 266.5 pounds. They were marked by removal of the right ventral fin. The first legal fish of this group reached 30 inches during 1963, the first year of the creel census. As a result, it is one plant that has been followed from initiation into the fishery to its virtual extinction.

Table 3 shows the number of fish of this plant caught annually during the 10 year period. A total of 407 or 27.1 per cent of the 1,500 fish stocked have been registered by anglers to date. This compares to other returns reported by Helm (1960) where 17 per cent of 488 muskellunge tagged and stocked in High Lake, Vilas County, Wisconsin, were caught by anglers at ages IV through X and in Fishtrap Lake, Vilas County where a 1.7 per cent return was reported. The muskellunge of this group caught to date weighed 4,070 pounds or 2.03 tons for an average of 10.0 pounds each. The total weight of the registered fish in this plant was 15.3 times the initial planting weight.

Table 3. Summary of Right Ventral Marked Muskellunge\*  
Caught at Little Green Lake, Green Lake County, 1963-1972

| Year          | Number<br>Caught | Average<br>Length | Average<br>Weight | Range<br>in Length | Range<br>in Weight | Total<br>Weight<br>(pounds) | Percent<br>of Total |
|---------------|------------------|-------------------|-------------------|--------------------|--------------------|-----------------------------|---------------------|
| 1963          | 75               | 31.3              | 7.7               | 30.0-34.5          | 6.0-14.8           | 574.2                       |                     |
| 1964          | 129              | 32.9              | 8.7               | 30.0-37.1          | 6.0-13.3           | 1,121.7                     |                     |
| 1965          | 94               | 33.5              | 9.3               | 30.0-40.5          | 5.8-18.8           | 878.3                       |                     |
| 1966          | 42               | 35.4              | 11.1              | 30.3-40.5          | 7.3-18.0           | 464.6                       |                     |
| 1967          | 38               | 36.5              | 12.4              | 30.5-42.5          | 7.0-20.0           | 469.7                       |                     |
| 1968          | 14               | 38.8              | 15.1              | 31.5-44.0          | 7.3-21.4           | 211.9                       |                     |
| 1969          | 8                | 39.8              | 16.5              | 36.0-45.0          | 11.3-22.3          | 131.6                       |                     |
| 1970          | 3                | 44.2              | 20.0              | 42.0-45.3          | 12.2-24.0          | 59.9                        |                     |
| 1971          | 3                | 44.0              | 22.6              | 40.3-46.3          | 16.5-27.5          | 132.0                       |                     |
| 1972          | 1                | 45.5              | 25.8              | 45.5               | 25.8               | 25.8                        |                     |
| <u>Totals</u> | <u>407</u>       | <u>33.9</u>       | <u>10.0</u>       | <u>30.0-46.3</u>   | <u>5.8-27.5</u>    | <u>4,069.7</u>              |                     |

\*Stocked September 22, 1960  
1,500 Stocked  
Length 8.4-13.3"  
Weight 266.5 pounds

Largest numbers of fish of this plant caught were during their fourth year of life when 129 or 31.7 per cent of the total was harvested by fishermen. This was followed in order by catches in the fifth year of 94 or 23.2 per cent, the third year of 75 or 18.4 per cent and the sixth year of 42 or 10.3 per cent. Catches decreased drastically after the seventh year in the lake when 38 or 9.3 per cent of the total was caught, followed by 14 or 3.4 per cent in the eighth year of life, 8 or 2.0 per cent in the ninth year, 3 each or 0.7 per cent in the tenth and eleventh years and 1 or 0.2 per cent in the twelfth year of life. This indicates the maximum life span of muskellunge in Little Green Lake to be near 12 years of age. In contrast, Oehmcke, Johnson, Klingbiel and Wistrom (1958) report the world record muskellunge, which weighed in excess of 69 pounds, to be over 30 years of age as determined from vertebrae and scales.

Average annual growth showed a progressive increase in both length and weight. Although not shown in the table, it is obvious that the greatest increase in length and weight takes place during the 3-5 years while the fish grows to legal size.

Using data supplied in Table 3, a weight-length curve fitted well to a log-log relationship as evidenced by a correlation coefficient of 0.994. The curve in linear form is expressed as:

$$\begin{array}{l} \log Y = a + b \log X \\ \text{or} \quad \log W = 3.79 + 3.124 \log L \end{array}$$

Calculated weights starting at 30.0 inches and in increments of 2.5 inches are: 6.7, 8.6, 10.8, 13.4, 16.4, 19.8 and 23.6 at 45.0 inches.

Similarly, an age-weight relationship curve supplied a very high correlation coefficient of 0.980 using the equation:

$$\begin{array}{l} Y = BX \\ \text{or} \quad W = .16 + 2.01 X \quad \text{Where } X = 0 \text{ for } 1960 \\ \quad \quad \quad \quad \quad \quad \quad \quad \text{and } 12 = 1972 \end{array}$$

Calculated values for  $X = 3, 6, 9$  and  $12$  years of age were 5.9, 11.9, 17.9 and 24.0 pounds.

Table 3 also supplied a high correlation coefficient of 0.96 when age-length was compared:

$$Y = a + b (\log X)$$

or 
$$L = 17.8 + 24.31 (\log X) \text{ Where } X = 0 \text{ for } 1960, \text{ etc.}$$

Calculated values when  $X = 3, 6, 9$  and 12 years are 29.4, 36.7, 41.0 and 44.0 inches.

Annual average growth of muskellunge stocked in Little Green Lake during 1960 compared to the fastest and slowest growth reported in the scientific literature is shown in Table 4. Erickson (1961) reports the fastest growth recorded in Deer Creek Lake, Ohio and Buss (1961) indicates the rapid growth of muskellunge in Pennsylvania waters. In both cases, Little Green Lake fish grew more slowly. Somewhat comparable growth was reported in Bone Lake, Wisconsin (Johnson, 1971). Little Green Lake muskellunge grew considerably faster than those in Big Spider Lake, Wis. (Johnson, 1971), and Corrine and George Lakes in Wisconsin as reported by Schmitz and Hetfield (1965) and Gammon and Hasler (1965).

#### Calculated Mortality of 1960 Plant

Table 3 shows that the first muskellunge of the 1960 plant reached the legal size of 30.0 inches during middle summer of 1963, and that all fish of that group were not of legal size until 1965 when they were 5 years of age. With almost total disappearance of the 1960 plant by the 1972 season, the mortality rate was calculated using a "cohort" or "time specific" life table analysis. It shows that for the period from 1963 to 1972 the indicated annual mortality rate is 43 per cent. For 1965 to 1972, when all fish caught were greater than 30.0 inches, the life table analysis supplies a mortality rate of 47 per cent per year.

While the data are based on fish caught, the mortality estimate reflects total mortality as catch is related to population level. This presumes also that fishing pressure in terms of impact on the population is relatively constant.

Table 4. Average Length of Little Green Lake 1960 Stocked Muskellunge at Different Ages Compared to Growth in Other Lakes

| Age in<br>Years | Average Length in Inches         |                                |                            |                       |                                |                          |                         |
|-----------------|----------------------------------|--------------------------------|----------------------------|-----------------------|--------------------------------|--------------------------|-------------------------|
|                 | Little<br>Green<br>Lake,<br>Wis. | Deer<br>Creek<br>Lake,<br>Ohio | Pennsyl-<br>vania<br>Lakes | Bone<br>Lake,<br>Wis. | Big<br>Spider<br>Lake,<br>Wis. | Corrine<br>Lake,<br>Wis. | George<br>Lake,<br>Wis. |
| II              |                                  | 29.8                           | 26.0                       |                       |                                | 16.0                     | 17.0                    |
| III             | 31.3                             | 35.7                           |                            | 24.9                  | 20.8                           | 18.5                     | 19.0                    |
| IV              | 32.9                             | 35.8                           | 34.0                       | 28.5                  | 23.8                           |                          |                         |
| V               | 33.5                             | 37.8                           | 37.5                       | 32.0                  | 26.3                           |                          | 22.0                    |
| VI              | 35.4                             |                                |                            | 34.1                  | 27.0                           |                          |                         |
| VII             | 36.5                             |                                | 39.2                       | 36.5                  | 28.8                           | 24.4                     |                         |
| VIII            | 38.8                             |                                | 39.8                       | 38.5                  | 30.0                           | 26.0                     | 25.0                    |
| IX              | 39.8                             |                                |                            | 40.5                  | 31.2                           |                          | 27.9                    |
| X               | 44.2                             |                                |                            | 41.5                  |                                |                          |                         |
| XI              | 44.0                             |                                |                            |                       |                                |                          |                         |
| XII             | 45.5                             |                                |                            |                       |                                |                          |                         |

FIGURE 1 - CALCULATED MORTALITY OF 1960 MUSKELLUNGE PLANTS

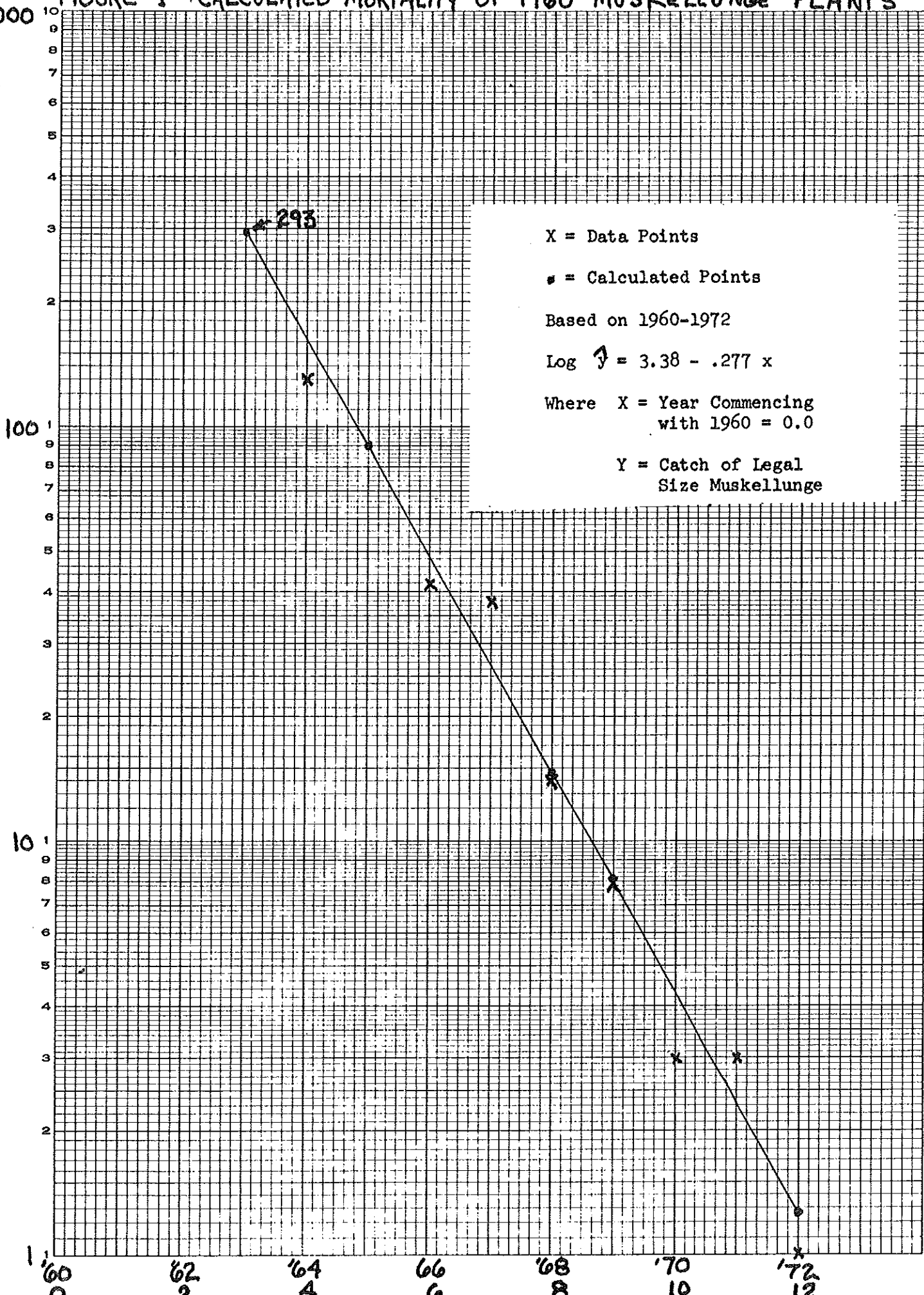


Figure 1 shows a linear semi-log regression line when the log of the catch is used. This implies a uniform mortality rate through the period. In actuality, major mortality of a plant usually occurs shortly after stocking. The figure therefore shows only the mortality of fish of the 1960 plant that had survived to legal size.

Two separate forms of mortality, natural and that caused by anglers must be considered. The mortality rate shown however generally conforms to angler harvest when muskellunge reach large size.

Figure 1 shows the plotted points to conform to the linear form from 1964 to 1972. However, a calculation from the equation of an initial potential catch (year =0) gives a value of about 2,400 which is far from the stocking figure of 1,500. However, catch data are used, rather than population data.

#### Month of Capture

Table 5 shows the monthly distribution of capture during the 10 year creel census period. Traditionally, the month of May opens the muskellunge season. During the 10 year creel census, the opening date has ranged between May 4 and May 14. Therefore, the table shows that the largest concentrated harvest actually took place during May with 301 or 22.3 per cent of the muskellunge registered. The largest numbers of fish were registered during June with 304 or 22.6 per cent. Surprisingly, the month of August, when aquatic plants and algae peak in the lake, produced the third highest number of fish with 246 or 18.2 per cent. Lowest numbers of muskellunge were taken during November when 61 or 4.5 per cent of the muskellunge were taken during the 10 years of creel census. The open season for muskellunge closed on November 15 during the first 7 years of the survey and on November 30, the last 3 years.

#### Muskellunge Catch by Date

An analysis of the 10 years of catch records in Table 6 shows the exact dates on which all muskellunge were captured. The table also shows the number of years during the creel census that fish were captured on each day.



Table 5. Month of Capture of Muskellunge at Little Green Lake, Green Lake County, 1963-1972

| <u>Year</u>                 | <u>May</u>  | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>November</u> | <u>Annual<br/>Total</u> | <u>Percent<br/>of Total</u> |
|-----------------------------|-------------|-------------|-------------|---------------|------------------|----------------|-----------------|-------------------------|-----------------------------|
| 1963                        | 10          | 11          | 14          | 36            | 30               | 17             | 18              | 136                     | 10.1                        |
| 1964                        | 30          | 36          | 27          | 45            | 19               | 16             | 6               | 179                     | 13.3                        |
| 1965                        | 40          | 54          | 15          | 25            | 10               | 6              | 6               | 156                     | 11.6                        |
| 1966                        | 24          | 20          | 3           | 10            | 9                | 7              | 0               | 73                      | 5.4                         |
| 1967                        | 25          | 24          | 3           | 1             | 11               | 5              | 1               | 70                      | 5.2                         |
| 1968                        | 25          | 19          | 4           | 17            | 7                | 6              | 2               | 80                      | 5.9                         |
| 1969                        | 27          | 22          | 6           | 6             | 8                | 2              | 2               | 73                      | 5.4                         |
| 1970                        | 19          | 14          | 7           | 10            | 5                | 6              | 2               | 63                      | 4.7                         |
| 1971                        | 30          | 31          | 11          | 32            | 21               | 16             | 8               | 149                     | 11.0                        |
| 1972                        | 71          | 73          | 35          | 64            | 56               | 54             | 16              | 369                     | 27.4                        |
| <u>Totals</u>               | <u>301</u>  | <u>304</u>  | <u>125</u>  | <u>246</u>    | <u>176</u>       | <u>135</u>     | <u>61</u>       | <u>1,348</u>            | <u>100.0</u>                |
| <u>Percent<br/>of Total</u> | <u>22.3</u> | <u>22.6</u> | <u>9.3</u>  | <u>18.2</u>   | <u>13.1</u>      | <u>10.0</u>    | <u>4.5</u>      | <u>100.0</u>            |                             |

Table 6. Muskellunge Catch by Date and Number of Years Fish Caught on that Date, 1963-1972, at Little Green Lake.

| <u>Day</u>    | <u>May</u> | <u>June</u> | <u>July</u> | <u>August</u> | <u>September</u> | <u>October</u> | <u>November</u> |
|---------------|------------|-------------|-------------|---------------|------------------|----------------|-----------------|
| 1             |            | 11 (4)      |             | 5 (2)         | 7 (4)            | 7 (4)          | 2 (2)           |
| 2             |            | 12 (7)      | 2 (2)       | 6 (3)         | 10 (3)           | 10 (4)         | 6 (3)           |
| 3             |            | 16 (8)      | 4 (3)       | 5 (3)         | 11 (4)           | 9 (4)          | 1 (1)           |
| 4             | 1 (1)      | 9 (6)       | 5 (3)       | 5 (4)         | 4 (4)            | 4 (3)          | 2 (1)           |
| 5             |            | 14 (6)      | 2 (2)       | 8 (3)         | 8 (4)            | 6 (5)          | 3 (2)           |
| 6             |            | 25 (8)      | 8 (5)       | 3 (2)         | 7 (4)            | 2 (1)          | 4 (2)           |
| 7             |            | 17 (6)      | 6 (4)       | 4 (3)         | 9 (3)            | 6 (1)          | 4 (3)           |
| 8             | 16 (2)     | 10 (5)      | 6 (4)       | 4 (2)         |                  | 5 (4)          | 4 (2)           |
| 9             | 11 (4)     | 8 (5)       | 5 (2)       | 3 (3)         | 7 (4)            | 5 (4)          | 8 (3)           |
| 10            | 6 (3)      | 8 (6)       | 4 (4)       | 8 (4)         | 2 (2)            | 2 (2)          | 3 (3)           |
| 11            | 18 (4)     | 12 (6)      | 3 (1)       | 3 (3)         | 8 (6)            | 2 (1)          | 7 (5)           |
| 12            | 3 (2)      | 9 (5)       | 3 (3)       | 4 (4)         | 5 (3)            | 3 (2)          | 2 (2)           |
| 13            | 29 (5)     | 15 (5)      | 4 (4)       | 6 (4)         | 6 (4)            | 7 (5)          | 3 (3)           |
| 14            | 26 (6)     | 7 (6)       | 6 (3)       | 10 (6)        | 6 (5)            | 6 (4)          | 4 (2)           |
| 15            | 16 (8)     | 11 (7)      | 2 (2)       | 10 (5)        | 8 (3)            | 7 (4)          | 5 (2)           |
| 16            | 12 (6)     | 17 (9)      | 5 (4)       | 6 (3)         | 6 (2)            | 2 (2)          | 2 (2)           |
| 17            | 17 (5)     | 8 (5)       | 4 (2)       | 14 (5)        | 6 (3)            | 4 (2)          |                 |
| 18            | 7 (4)      | 11 (6)      | 8 (3)       | 8 (4)         | 7 (4)            | 3 (2)          | 1 (1)           |
| 19            | 7 (6)      | 10 (5)      | 7 (3)       | 7 (5)         | 6 (5)            | 3 (3)          |                 |
| 20            | 8 (4)      | 12 (5)      | 3 (2)       | 5 (3)         | 4 (3)            | 6 (3)          |                 |
| 21            | 9 (5)      | 6 (4)       | 3 (2)       | 9 (3)         | 3 (2)            | 6 (1)          |                 |
| 22            | 18 (7)     | 6 (5)       | 4 (2)       | 13 (6)        | 3 (3)            | 4 (2)          |                 |
| 23            | 9 (5)      | 2 (2)       | 2 (2)       | 14 (7)        | 10 (4)           |                |                 |
| 24            | 11 (7)     | 8 (3)       | 6 (5)       | 12 (6)        | 7 (3)            | 3 (2)          |                 |
| 25            | 10 (5)     | 6 (4)       | 4 (3)       | 7 (4)         | 6 (4)            | 4 (3)          |                 |
| 26            | 9 (5)      | 8 (3)       | 4 (4)       | 16 (6)        | 2 (2)            | 4 (3)          |                 |
| 27            | 5 (2)      | 10 (5)      | 3 (3)       | 14 (6)        | 4 (3)            | 6 (4)          |                 |
| 28            | 10 (5)     | 7 (3)       | 2 (2)       | 10 (6)        | 8 (5)            | 1 (1)          |                 |
| 29            | 15 (8)     | 2 (2)       | 2 (2)       | 13 (6)        | 2 (2)            | 2 (2)          |                 |
| 30            | 16 (6)     | 7 (3)       | 5 (4)       | 7 (4)         | 4 (3)            | 2 (1)          |                 |
| 31            | 12 (5)     |             | 3 (3)       | 7 (4)         |                  | 4 (2)          |                 |
| <u>Totals</u> | <u>301</u> | <u>304</u>  | <u>125</u>  | <u>246</u>    | <u>176</u>       | <u>135</u>     | <u>61</u>       |

Note: Numbers in parenthesis indicate the number of years fish were caught on that date during the 10-year creel census.

Opening Dates were: May 4, 1963  
May 9, 1964  
May 8, 1965  
May 14, 1966  
May 13, 1967  
May 11, 1968  
May 10, 1969  
May 9, 1970  
May 8, 1971  
May 13, 1972

Closing Dates were: November 15-1963-1969  
November 30-1970-1972

The earliest capture was on May 4 during 1963 when the season opened on that date. The latest date a muskellunge was caught was November 18, 1972. Fish were never caught or registered on 3 dates during the 10 year period, namely July 1, September 8 or October 23.

The largest number of fish registered on any date is 29 on May 13, with fish being caught during 5 seasons. The table shows that 2 season openings occurred on that date accounting for the large number. The next largest number listed is 26 during 6 years on May 14, including one opening day and 2 days following the season opening. The next most productive date shown on the table is June 6 when 25 fish were registered during 8 years.

No date on the table shows fish registered on all 10 years of the study. June 16 is apparently the most consistent productive day of the muskie fishing season with fish registered during 9 of the 10 years of the survey. This is followed by May 15 and 29, and June 3 and 6 with 8 years of registrations. Muskellunge were caught and registered on 7 of the 10 years on May 22 and 24, June 2 and 15, and August 23.

The table shows the normal mid-summer lull by recording 10 year catches consistently below 10 fish for the period from June 28 through August 13. From August 14 to September 3, 12 of the 21 days showed 10 or more muskellunge registered. It must be recognized that much of the decline shown in numbers of fish caught in September through the November closing is due to diversion of sportsmen to other activities.

The highest producing three-day periods for the various months during the study were May 13-15 (71 fish), June 5-7 (56), July 6-8 (20), August 26-28 (40), September 1-3 (28), October 1-3 (26) and November 9-11 (18).

#### Day of the Week Muskellunge Caught

Table 7 shows a summation of the day of the week muskies were caught during the creel census. As may be expected, Saturdays produced 447 or 33.2

Table 7. Day of the Week Muskellunge Caught, Little Green Lake, 1963-1972

| Day of<br>the Week | Year |      |      |      |      |      |      |      |      |      | Percent<br>of Total |       |
|--------------------|------|------|------|------|------|------|------|------|------|------|---------------------|-------|
|                    | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 |                     | Total |
| Sunday             | 29   | 44   | 33   | 14   | 10   | 7    | 13   | 14   | 21   | 76   | 261                 | 19.4  |
| Monday             | 10   | 11   | 11   | 7    | 10   | 6    | 7    | 5    | 14   | 34   | 115                 | 8.5   |
| Tuesday            | 8    | 17   | 17   | 3    | 9    | 7    | 4    | 11   | 18   | 43   | 137                 | 10.2  |
| Wednesday          | 10   | 13   | 14   | 6    | 5    | 4    | 8    | 2    | 14   | 39   | 115                 | 8.5   |
| Thursday           | 14   | 7    | 15   | 6    | 3    | 7    | 8    | 8    | 12   | 40   | 120                 | 8.9   |
| Friday             | 20   | 21   | 13   | 7    | 8    | 10   | 14   | 8    | 19   | 33   | 153                 | 11.3  |
| Saturday           | 45   | 66   | 53   | 30   | 25   | 39   | 19   | 15   | 51   | 104  | 447                 | 33.2  |
| Totals             | 136  | 179  | 156  | 73   | 70   | 80   | 73   | 63   | 149  | 369  | 1,348               | 100.0 |

per cent of all the fish registered, followed by Sunday with 261 or 19.4 per cent. Combined, week-end fishermen caught 708 or 52.6 per cent of all fish registered. Lowest catches were recorded on Mondays and Wednesdays, each totalling 115 fish or 8.5 per cent.

#### Hour of Capture

A total of 1,195 successful fishermen recorded the exact time muskellunge were caught. They are shown in Table 8. In a number of reports, the hour was listed, but did not note whether it was a.m. or p.m., hence they could not be used in the report.

The table shows the most successful hour of fishing during the period to be from 7:00 to 7:59 p.m. when 129 fish were caught. This was followed by 10:00 to 10:59 a.m. (108), 8:00 to 8:59 a.m. (94) and 6:00 to 6:59 p.m. (91).

The most successful three-hour fishing period during the day was from 6:00 to 8:59 p.m. when 308 or 22.8 per cent of the fish were caught. The second most successful three-hour period was from 8:00 to 10:59 a.m. when 288 or 21.4 per cent of the muskellunge were registered.

The earliest fish registered (3) were taken at 4:00 a.m. The latest fish taken was recorded as being caught at 11:10 p.m.

#### Baits Used

A total of 86 artificial and 7 live baits were used to capture the muskellunge registered during the 10 year period. A list of the baits taking more than 10 fish follows:

| <u>Bait</u>       | <u>Number Caught</u> |
|-------------------|----------------------|
| 1. Pikie minnow*  | 231                  |
| 2. Bucktails      | 155                  |
| 3. Mepps spinners | 107                  |
| 4. Live sucker    | 71                   |
| 5. Rapala         | 62                   |
| 6. Bobby bait     | 58                   |

Table 8. Hour of Capture of Muskellunge, Little Green Lake, Green Lake County, 1963-1972

| <u>Year</u>   | <u>A.M. Hours</u>     |                       |                       |                       |                       |                       |                         | <u>P.M. Hours</u>       |                         |                       |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|-------------------------|-------------------------|-----------------------|
|               | <u>4:00-<br/>4:59</u> | <u>5:00-<br/>5:59</u> | <u>6:00-<br/>6:59</u> | <u>7:00-<br/>7:59</u> | <u>8:00-<br/>8:59</u> | <u>9:00-<br/>9:59</u> | <u>10:00-<br/>10:59</u> | <u>11:00-<br/>11:59</u> | <u>12:00-<br/>12:59</u> | <u>1:00-<br/>1:59</u> |
| 1963          |                       | 1                     | 4                     | 6                     | 5                     | 3                     | 8                       | 6                       | 6                       | 7                     |
| 1964          |                       | 2                     | 14                    | 12                    | 20                    | 13                    | 12                      | 9                       | 9                       | 2                     |
| 1965          | 2                     | 2                     | 3                     | 6                     | 3                     | 5                     | 7                       | 4                       | 5                       | 3                     |
| 1966          |                       | 3                     | 9                     | 5                     | 3                     | 5                     | 3                       | 7                       | 4                       | 6                     |
| 1967          | 1                     | 3                     | 1                     | 5                     | 3                     | 5                     | 6                       | 6                       | 2                       | 4                     |
| 1968          |                       | 1                     | 8                     | 4                     | 3                     | 5                     | 6                       | 6                       | 6                       | 3                     |
| 1969          |                       |                       | 3                     | 6                     | 6                     | 8                     | 6                       | 5                       | 5                       | 2                     |
| 1970          |                       |                       | 2                     | 4                     | 6                     | 9                     | 6                       | 1                       | 3                       | 3                     |
| 1971          | 1                     | 1                     |                       | 7                     | 12                    | 9                     | 15                      | 4                       | 9                       | 7                     |
| 1972          | 1                     |                       | 5                     | 21                    | 33                    | 24                    | 39                      | 24                      | 12                      | 16                    |
| <u>Totals</u> | <u>5</u>              | <u>13</u>             | <u>49</u>             | <u>76</u>             | <u>94</u>             | <u>86</u>             | <u>108</u>              | <u>72</u>               | <u>61</u>               | <u>53</u>             |

| <u>Year</u>    | <u>P.M. Hours</u>     |                       |                       |                       |                       |                       |                       |                       |                         |                         |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|-------------------------|
|                | <u>2:00-<br/>2:59</u> | <u>3:00-<br/>3:59</u> | <u>4:00-<br/>4:59</u> | <u>5:00-<br/>5:59</u> | <u>6:00-<br/>6:59</u> | <u>7:00-<br/>7:59</u> | <u>8:00-<br/>8:59</u> | <u>9:00-<br/>9:59</u> | <u>10:00-<br/>10:59</u> | <u>11:00-<br/>11:59</u> |
| 1963           | 1                     | 8                     | 8                     | 3                     | 3                     | 6                     | 6                     |                       |                         |                         |
| 1964           | 3                     | 2                     | 9                     | 9                     | 12                    | 21                    | 15                    | 3                     |                         |                         |
| 1965           | 4                     | 5                     | 5                     | 3                     | 13                    | 19                    | 10                    | 2                     | 1                       |                         |
| 1966           |                       | 5                     | 4                     | 1                     | 2                     | 7                     | 6                     | 1                     |                         |                         |
| 1967           | 2                     |                       | 5                     | 9                     | 3                     | 5                     | 8                     | 2                     | 2                       |                         |
| 1968           | 3                     | 3                     | 2                     | 6                     | 6                     | 9                     | 5                     | 3                     |                         |                         |
| 1969           | 4                     |                       | 3                     | 5                     | 9                     | 4                     | 1                     | 2                     |                         |                         |
| 1970           | 4                     | 6                     | 6                     | 1                     |                       | 6                     | 6                     |                       |                         |                         |
| 1971           | 12                    | 5                     | 7                     | 8                     | 14                    | 19                    | 16                    | 2                     | 1                       |                         |
| 1972           | 20                    | 17                    | 21                    | 27                    | 29                    | 33                    | 15                    | 3                     | 1                       | 1                       |
| <u>Totals*</u> | <u>53</u>             | <u>51</u>             | <u>70</u>             | <u>72</u>             | <u>91</u>             | <u>129</u>            | <u>88</u>             | <u>18</u>             | <u>5</u>                | <u>1</u>                |

|     | <u>Bait</u>            | <u>Number Caught</u> |
|-----|------------------------|----------------------|
| 7.  | Paw Paw Pikie          | 49                   |
| 8.  | Suick                  | 45                   |
| 9.  | Jigs                   | 42                   |
| 10. | Live minnow            | 41                   |
| 11. | Vamp Spook             | 31                   |
| 12. | Daredevil              | 27                   |
| 13. | Cisco Kid              | 25                   |
| 14. | Lee bait               | 21                   |
| 15. | Bass-O-Reno            | 17                   |
| 16. | Abu Reflex             | 16                   |
| 17. | Jitterbug              | 15                   |
| 18. | Mudpuppy               | 14                   |
| 19. | Mouse                  | 14                   |
| 20. | Snodlow                | 13                   |
| 21. | River runt             | 13                   |
| 22. | Live nitecrawler       | 13                   |
| 23. | Artificial nitecrawler | 11                   |
| 24. | Baby rattle            | 11                   |

\* Includes both straight and jointed models.

Using the list above, a further breakdown of baits is:

| <u>Type of Bait</u>             | <u>Number Caught</u> |
|---------------------------------|----------------------|
| Plugs                           | 619                  |
| Bucktails                       | 155                  |
| Spinners                        | 123                  |
| Live fish baits                 | 112                  |
| Jigs                            | 42                   |
| Spoons                          | 27                   |
| Live or artificial nitecrawlers | 24                   |

Most distressing, particularly in view of the numbers of small muskellunge in the lake, is the rapid increase in the numbers of fishermen deliberately fishing for muskies with live suckers and minnows. For example, in the first 9 years of the survey, only 22 muskellunge were caught using live suckers. This was supplemented by a catch of 49 fish during 1972, representing 13.3 per cent of the 1972 total. Undersized fish caught by this method are usually more seriously harmed by this practice than when artificial baits are used.

#### Location of Fish Caught

Fishermen registering muskellunge also recorded the location on the lake where their fish were caught. These locations have been broken down into 10 major broad areas. The numbers of fish caught in each area (including all local names) are as follows:

|   | <u>Number Caught</u> |
|---|----------------------|
| 1. Markham's (Musky) Bay and Point, and Rock Pile                       | 230                  |
| 2. Frei's, Hedrick's, Roit's or Don and Ann's Bay, The Park or Landry's | 170                  |
| 3. Lakeview or Seymer's Fernwood Bay, and Butenhoff's Point             | 156                  |
| 4. Sand Rock and North Shore  | 146                  |
| 5. Pop's or Kitty's Bay, East Shore or Landing                          | 117                  |
| 6. Welk's Bay or Landing, Island or Southwest access                    | 77                   |
| 7. Kearley's Bay or Point   | 76                   |
| 8. Deep water   | 72                   |
| 9. Miller's or Lasanski's Point and Russell's Bay                       | 25                   |
| 10. South Shore   | 25                   |

#### Origin of Fishermen

Fishermen reporting the capture of muskellunge came from 115 Wisconsin cities, plus 43 Illinois, 4 Indiana, 3 Michigan, 2 Arizona, and 2 Kentucky cities. Other states were represented by one fisherman each from Florida, Colorado, Utah and New Jersey.



Fishermen from various cities capturing the most muskellunge during the survey were as follows:

| <u>City</u>                    | <u>Number Caught</u> |
|--------------------------------|----------------------|
| Milwaukee                      | 214                  |
| Markesan and Little Green Lake | 124                  |
| Waupun                         | 102                  |
| Fond du Lac                    | 64                   |
| West Bend                      | 56                   |
| Paw Paw, Michigan              | 52                   |
| Rockford, Illinois             | 30                   |
| Chicago, Illinois              | 30                   |
| Madison                        | 28                   |
| Van Dyne                       | 20                   |
| Wauwatosa                      | 20                   |
| Muskego                        | 19                   |
| Beaver Dam                     | 18                   |
| Appleton                       | 17                   |
| St. Francis                    | 16                   |
| Whitewater                     | 16                   |
| Menasha                        | 16                   |
| Aurora, Illinois               | 16                   |
| Janesville                     | 13                   |
| Ripon                          | 12                   |
| Racine                         | 12                   |
| Oconomowoc                     | 12                   |
| Crystal Lake, Illinois         | 12                   |
| Cudahy                         | 11                   |
| Horicon                        | 10                   |
| Neenah                         | 10                   |

Tagging Study

During the period from May, 1960 to April, 1964, a total of 269 muskellunge were tagged after capture by D.N.R. crews using electro-fishing equipment or fyke nets. Table 9 shows information pertaining to the period of time to their recapture by fishermen.

Table 9. Muskellunge tagged and years to recapture, Little Green Lake, Green Lake County, 1960-1968

| Date Tagged             | Number Tagged | Years to Recapture by Fishermen |      |      |     |     |     |     |     | Number and Per Cent Returned |
|-------------------------|---------------|---------------------------------|------|------|-----|-----|-----|-----|-----|------------------------------|
|                         |               | 0+                              | 1+   | 2+   | 3+  | 4+  | 5+  | 6+  | 7+  |                              |
| May, 1960               | 11            | 2                               | 1    |      |     |     |     |     | 1   | 4 (36.4)                     |
| May, 1961               | 11            |                                 | 2    | 1    |     |     |     |     |     | 3 (27.3)                     |
| October, 1961           | 33            | 4                               | 3    | 2    | 1   |     |     | 1   |     | 11 (33.3)                    |
| May, 1962               | 20            | 4                               | 2    | 2    | 2   |     |     |     |     | 10 (50.0)                    |
| April, 1963             | 86            | 7                               | 1    | 1    |     | 2   | 1   |     |     | 12 (14.0)                    |
| May, 1963               | 73            | 14                              | 9    | 5    |     |     |     |     |     | 28 (38.4)                    |
| April, 1964             | 35            | 6                               | 6    |      |     |     | 1   |     |     | 13 (37.1)                    |
| Total                   | 269           | 37                              | 24   | 11   | 3   | 2   | 2   | 1   | 1   | 81                           |
| Per Cent of Total       | 100.0         | 13.8                            | 8.9  | 4.1  | 1.1 | 0.7 | 0.7 | 0.4 | 0.4 | 30.1                         |
| Per Cent of Tag Returns |               | 45.7                            | 29.6 | 13.6 | 3.7 | 2.5 | 2.5 | 1.2 | 1.2 | 100.0                        |

All tagged muskellunge were marked with 0.5 inch diameter, circular, plastic Petersen tags held by pure nickel pins through the pterigiophores of the anterior portion of the dorsal lobe of the caudal fin.

Tagged fish ranged in size from 17.2 to 40.0 inches in total length and from 1.31 to 17.0 pounds.

The table shows that 81 of 269, or 30.1 per cent of all fish tagged were recaptured and reported by fishermen. The largest annual number of tagged fish reported caught totalled 37 or 45.7 per cent which were captured the same year they were tagged. Each year thereafter returns diminished nearly 50 per cent of the previous year.

The longest period of time elapsed between the initial tagging of a muskellunge and recapture by a fisherman was a 24.9 inch, 4.19 pound fish tagged on May 23, 1960. The fish was recaptured almost 8 years later on May 11, 1968 by Elden Bresee of Jefferson, Wisconsin when it was 43.8 inches long and weighed 21.5 pounds.

Another muskellunge caught by Charles Lakosh of Milwaukee on October 14, 1967, 41.8 inches long and 19.4 pounds was initially tagged at 18.3 inches and 1.8 pounds on October 4, 1961.

Two fisherman, Tom Temple of West Bend, Wisconsin and Herman Sandberg, Whitewater, Wisconsin each reported catching 3 tagged muskies. Five other anglers, Clyde Herman, Fond du Lac, Bud Moore and Ward Tetzlaff of Waupun, Robert Pearson, Beaver Dam, and Jim Paddock of Markesan each caught and reported 2 tagged fish.

#### Other Catches of Interest

Detailed information recorded on creel census cards was returned to boat livery operators during the first 4 years of the survey and is no longer available. Since 1967, information relating to the name of the fisherman and all other pertinent data has been permanently recorded. The information that follows then generally only pertains to that period from 1967 to 1973.

The most successful fisherman during the period was Gale Radtke of Paw Paw, Michigan who recorded catching 52 muskellunge. Bill Williams of Markesan registered the second highest number with 34 fish, followed by Ward Tetzlaff of Waupun with 29 fish taken during the entire 10 year period.

Bill Williams of Markesan recorded the high of 21 muskies during a full fishing season, followed by Gale Radtke of Paw Paw, Michigan with 18 and 16 in separate years.

Largest numbers of legal muskellunge caught by a feminine angler were recorded by Barbara Snoddy of Milwaukee with 5 fish. Dave Snoddy recorded the most consistently large fish in the 15.0 to 27.5 pound category.

Mark Skupas, Oshkosh, at the age of 6 years was the youngest angler to record a muskellunge during the 10 year study, followed by 7 year old Walter Zinniel of Fond du Lac.

#### Hybrid Muskellunge

During 1970, hybrid muskellunge were first stocked in Little Green Lake. This was accomplished in two plants: (1) A group of 750, two month-old fish weighing 83 pounds that ranged from 7-9 inches in length stocked during July, 1970, and (2) An October, 1970, plant of larger fish ranging from 15-17 inches, five months old, totalling 1,854 muskellunge that weighed 948 pounds.

Hybrid muskellunge are incapable of reproducing because the testes of male fish atrophy and are non-functional. Hybrid females are capable of producing mature-size eggs that have been back-crossed with true muskellunge males.

The creel census records show the first legal hybrid was caught on May 15, 1972 when it was 2 years of age. Two hybrids were registered during May, 2 in June, 13 in July, 38 in August, 39 in September, 38 in October and 15 in November for a total of 147. Hybrid muskellunge comprised 39.8 per cent of all fish registered during 1972.

Analysis of the hybrids registered shows that they averaged 30.9 inches, with a range from 30.0 to 33.0 inches in length.

The 147 hybrids weighed a combined total of 983.5 pounds with an average of 6.7 pounds. They ranged from 5.5 to 9.5 pounds. The total weight of hybrids taken in 1972 is within 48 pounds of the total weight of the 1970 plant.

Most hybrid fish were captured using live suckers for bait, with 31 taken. The next most effective bait, the bucktail took 22, followed by 17 with live minnows and 14 with the various Mepps spinners.

Hybrid muskellunge taken in seine hauls made in 1971 and in 1972 showed that almost every fish checked appeared to have eaten a bluegill or sunfish. True muskellunge, similarly sampled rarely, if ever, appeared to feed on sunfish-shaped fish. Johnson (1969) reports that northern pike caught by anglers in Murphy Flowage showed a distinct tendency to feed on bluegills, which comprised 59.1 per cent by weight of all food taken during the year. Hybrid muskellunge give every indication of establishing feeding habits similar to the northern pike progenitors in their ancestry.

#### Remarks

The 10 year voluntary creel census at Little Green Lake has supplied a great deal of information helpful to fish managers, some of it unavailable or only rarely recorded in fisheries literature. No doubt the information can similarly be used to assist fishermen in planning their fishing trips using the most successful baits, at the most productive time of the day and of the month, at the best locations.

Acknowledgements

Certainly this report would be impossible without the voluntary help of a great many people, the musky fishermen of Little Green Lake. Grateful thanks are also given to the boat livery operators who measured, weighed and recorded information without complaint for many years. Particular thanks are due to Margaret and Mel Frei, Mildred and John Welk, Herb Stressing, Helen and Hugo Schuknecht, Don and Ann Lemiesz and Catherine Stresing who recorded information for all, or a major portion of the study. Others, who assisted for shorter periods of time, but who supplied important information are Paul and Jan Roit, Mr. and Mrs. Howard Harrigan, Mr. and Mrs. Harold Hedrick, Mr. and Mrs. Vergne Kearley, Mr. and Mrs. Earl Kearley, Mr. and Mrs. Norman Seymer and Mr. and Mrs. Andy Sciano.

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Finally, this report is dedicated to two men who are responsible for the muskellunge in Green Lake - Richard Harris, Operations Chief of the Lake Michigan District who conceived of the idea of stocking the species as far south as Little Green Lake, and Charles N. Lloyd, retired Director of the Bureau of Fish Management whose untiring interest and encouragement in the project was sincerely appreciated.

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Fish staff specialists  
Fish area and asst. area managers  
Fish biologists  
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